

TRENDS IN THE DESIGN OF FRONT-END SYSTEMS FOR ROOM TEMPERATURE SOLID STATE DETECTORS

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ABSTRACT

The paper discusses the present trends in the design of lo-noise front-end systems for room temperature semiconductor detectors. The technological advancement provided by submicron CMOS and BiCMOS processes is examined from several points of view. The noise performances are a fundamental issue in most detector applications and suitable attention is devoted to them. However, other considerations are also important in judging how well a monolithic technology suits the front-end design. Among them, the way a technology lends itself to the realization of additional functions, for instance, the charge reset in a charge-sensitive loop or the time-variant filters featuring the special weighting functions that may be requested in some applications of CdTe or CZT detectors. Emphasis is on the relative merits, from the noise standpoint, of a Mosfet or a bipolar transistor front-end. This analysis serves also the purpose of judging whether the present processes supersede the solutions featuring a field-effect transistor as afffront-end element.

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